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JOURNAL

OF THE

Pan-Pacific Research Institution

A Periodical Record of Investigations Bearing on Problems of Food Production, Distribution, Conservation and Consumption, as well as on Public Health, and Race and Population Problems as Related to the Countries Bordering on the Pacific.

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AT PRESENT PUBLISHED QUARTERLY AT HONOLULU, HAWAII
BY THE
PAN-PACIFIC UNION

More frequent publication as acceptable material is contributed.

Pan-Pacific Science Conferences of the Year

Two international science bodies born of the Pan-Pacific Union are holding conferences in Java during the month of May; one, the Pacific Science Conference, was organized under the auspices of the Pan-Pacific Union in 1921 and has since held conference meets in Australia and Japan. The other science child of the Pan-Pacific Union is the International Sugar Technologist Association, begun as the sugar section of the First Pan-Pacific Food Conservation Conference held in Honolulu in 1924 under the auspices of the Pan-Pacific Union. This body of sugar technologists has since met in Porto Rico and in Cuba. The Pan-Pacific Union is inviting it to once more meet in session in Honolulu as the Sugar Section of the Second Pan-Pacific Food Conservation Conference in August, 1931.

The first tentative agenda of this conference is published in the current number of the Journal of the Pan-Pacific Research Institution, and it is hoped will elicit response and suggestions from Food Scientists in every part of the Pacific.

The Pan-Pacific Science Council in Honolulu has prepared this tentative agenda and has suggested the calling by the Pan-Pacific Union of a Second Food Conservation Conference. The current number of the Mid-Pacific Magazine contains a series of papers on Food and Population problems of the Pacific, prepared by members of the Pan-Pacific Science Council.

These papers, some of them read at the Pan-Pacific Research Institution, have been corrected by the authors. It is not an easy task to edit science papers, especially when some of them have been stenographic reports made of impromptu addresses from scientists called on at the meetings at the Pan-Pacific Research Institution. The Magazine is deeply indebted to Dr. Frederick Krauss of the University of Hawaii in helping to begin this quarterly series of Popular Science illustrated magazine numbers, but during his year abroad it was found difficult to secure the services of scientists who could return needed manuscripts with the promptness demanded by the printing press, so that typographical errors were apt to appear. The present plan is to schedule the publication of science papers so far in advance that proof sheets may be sent to the far away contributors for correction and amendment before final publication.

During the coming two years illustrated popular science articles from every Pacific land are solicited, especially those dealing with the race, population and food problems of the Pacific, set forth in the agenda herewith, for discussion at the next Food Conservation Conference.

Every quarter the Journal of the Pan-Pacific Research Institution is published, several thousand copies distributed to scientists and science bodies, and the Journal is also bound with the quarterly number of the Mid-Pacific Magazine given over to Popular Science illustrated articles of interest to the scientists of the Pacific area.

The Journal is sent free to scientists and to science bodies. The Mid-Pacific Magazine, an illustrated monthly, is sent at a subscription price of three dollars a year.

Numerous international organizations working for the better understanding between groups of workers about the greatest of oceans have grown out of conferences called and financed by the Pan-Pacific Union. It is the hope of the Union that in time men in all lines of thought and action in the Pacific Area will have their separate organizations to bring together those who think alike and have common interests to promote for their own welfare and for the welfare of mankind.

The Second Pan-Pacific Food Conservation Conference

HONOLULU, AUGUST, 1931

On the advice of the Pan-Pacific Science Council in Honolulu, a second Pan-Pacific Food Conservation Conference is being planned to convene in Honolulu in August, 1931, under the auspices of the Pan-Pacific Union.

The following are the twelve chief subjects to be taken up and suggested to the councils in each Pacific land as the basis of the agenda for the second Pan-Pacific Food Conservation Conference:

I. Sugar Industry.

II. Field Crops, Production and Improvement.
Rice,
Soya beans,
Wheat,
Pineapples,
Root crops,
Forage crops,
Range Problems.

III. Horticulture.
Tree Fruits,
Small Fruits,
Nuts,
Bananas.

IV. Plant Industry.
Plant Quarantine,
Plant Introduction,
Plant Physiology,
Plant Pests,
Insects
Nematodes
Plant Diseases

V. Soils, Fertilizers, Land Improvement.

VI. Reclamation.
Irrigation,
Land Reclamation,
Erosion.

VII. Forests.
Forest Products.

VIII. Animal Industry.
Diseases.
Parasites.

IX. Fisheries.
Marine Conservation.

X. Economics.
Labor and Food Distribution,
Food Preservation,
Transportation,
Communications.

XI. International Law and Agreements.

XII. Permanent Organization.

A series of Wednesday night dinners are being held by the Pan-Pacific Science Council at the Pan-Pacific Research Institution to discuss the conference and to prepare a purely tentative agenda to submit to the agricultural scientists in each Pacific land for their approval, disapproval or suggestions for changes and amendments.

With this project in view, a preliminary report on the proceedings of the twelve sections is submitted, so far as they have taken action.

Section I. On Sugar Industry, it is hoped will be taken over and handled by the "International Society of Sugar Cane Technologists" which was born as a section of the First Pan-Pacific Food Conservation Conference held in Honolulu

in 1924 under the auspices of the Pan-Pacific Union. It is holding its third conference in Java in June, 1929. H. P. Agee, Chairman of the Sugar Section of the First Pan-Pacific Food Conservation Conference, with several sugar scientists will attend this conference from Hawaii and carry the invitation to the Society to hold its fourth conference in Honolulu in August, 1931, either independently or once more as a section of the Pan-Pacific Food Conservation Conference.

Section II. Field Crop Production and Improvement, has been considered by Dr. Frederick Krauss and his committee which makes the following report:

It was decided to consider the problem of field crops from the standpoint of the producer who has to depend upon his crops for a living. From this angle it is evident that the problem has a four-fold character, any one phase being of vital importance to the producer no matter what the particular crop may be. These four aspects may be stated as follows: (1) Production; (2) Conservation; (3) Distribution; (4) Consumption. It is with this problem in mind that the following agenda is submitted:

I. Crop Production and Improvement.
   - (a) Agricultural Geography. Areas suitable for production.
   - (b) Climate and its effect upon crop production.
   - (c) Soil management as it applies to crop production.
     1. Prevention of erosion.
     2. Tillage and cultural methods including implements and labor saving devices.
   - (d) Related sciences as they apply to crop production.
     1. Agricultural Physics.
     2. Agricultural Chemistry.
     3. Agricultural Bacteriology.
   - (e) Fertilizers and manures as they are means of maintaining soil fertility and increasing crop production.
   - (f) Cropping systems.
     1. Rotation of crops.
     2. Green manuring.
     3. Cover crops as factors in permanent agriculture.
   - (g) Utilization of by-products.
   - (h) Crop improvement in any given country.
     1. By breeding and selection.
     2. By plant introduction.
   - (i) Standardization and grading.

II. Conservation.
   - (a) Utilization of by-products and of the surplus.
   - (b) Equalization of labor.
   - (c) All other means of preventing waste in handling.

III. Distribution to consumer.
   - (a) Transportation — (1, land routes; 2, water routes).
   - (b) Warehousing (storage of produce).
   - (c) Agencies (factors).
   - (d) Financing of crop production.
   - (e) Produce expositions, etc.
   - (f) Marketing and middlemen.

IV. Consumption.
   - (a) Crop statistics and their value to the producer.
   - (b) Consumers in various countries.
     1. Home grown produce.
     2. Quantity imported.
     3. Disposal of surplus.
   - (c) Standards of living in the various countries.

Section III. Horticulture. Chairman Willis T. Pope and his committee submit the following agenda for this section:

1. Methods of preservation of fruit products.

(a) Need for legislation covering labeling imitation fruit products such as soda water, ice cream and syrups.

(b) Freezing storage as means of prolonging season and widening distribution of perishable fruits.

(c) Better methods of food preservation in the Orient.

2. The need of a Pan-Pacific Botanical Garden in Hawaii as a center of plant exchange in the Pacific area.

3. The need of a larger use of fruit and vegetables in the human dietary.

4. Desirability of a plant acclimatization station somewhere in the Pacific area.

5. The food value of the avocado and macadamia nut.

Section IV. Plant Industry. Chairman J. M. Westgate submits tentative agenda from chairmen of his subcommittees as follows:

Plant Quarantine Division of the Plant Industry Section.

Mr. David T. Fullaway, chairman, suggests the following tentative agenda:

1. Establishment of a central agency for the collection of information with regard to injurious insects and plant diseases from all those countries bordering the Pacific where such are known.

2. The wherewithal to start a biological survey for those countries where those things have not been studied.

3. Discussion of methods of establishing uniform plant quarantine regulations.

For the Plant Introduction Division of the Plant Industry Section, Willis T. Pope, chairman, suggests the following as a tentative agenda:

1. Effective methods for the transportation of propagating material.

2. Would it justify the Pan-Pacific countries to maintain a central cooperative Plant Distribution Station?

3. Should there be an International Plant Exchange?

For the Plant Physiology Division of the Plant Industry Section

Dr. H. F. Bergman, chairman, suggests the following tentative agenda:

Water relations.

The water requirements of various crop plants. The effect of differences in climate on water requirements. Factors affecting the rate of water absorption.

Temperature, aeration, acidity, physical properties of soils, kinds and concentration of mineral salts.

Studies on transpiration.

Light relations.

Studies on insolation.

Effect of quantity and quality of light on plant growth. Effect of length of day on vegetative growth and flowering.

Carbohydrate-nitrogen ratio in plant tissues in relation to fruiting habits.

Relation of mineral nutrients to plant growth.

Conditions affecting the absorption of mineral nutrients. Toxic effect of aluminium or other substances.

For the Plant Pests Division of the Plant Industry Section

Mr. Otto H. Swezey reported as follows:

"Invite entomologists in various Pacific countries to present papers relating to the subjects suggested in the preliminary plan of program.

1. Distribution of principal crop pests in Pacific regions, and their present status:

Sugar cane
Pineapple
Citrus
Banana
Coconut
Cocoa
Coffee
Rice
Taro
Miscellaneous horticultural pests
Miscellaneous vegetable pests.

2. Biological control work on insect pests in the Pacific; examples of success in this method of control.

3. Insect pests of livestock in the Pacific.

Cattle
Sheep
Hogs
Poultry

4. Food storage problems.

Insects destroying stored food products, and methods of controlling them.

5. Insects in relation to human welfare, as a factor in food production.

For the Plant Pathology Division of the Plant Industry Section

Dr. C. P. Sideris, chairman, suggests the following as a tentative agenda:

1. Diseases caused by fungi, bacteria and viruses in general on tropical plants.

2. Diseases of the major agricultural plants in the different countries of the Pacific.

3. Therapeutic measures adopted for the control of the different diseases in the various countries.

4. Physiological diseases of the various crops in the different countries.

5. Distribution of the various parasitic organisms in the different countries in respect to crops and environment.

R. H. Van Zwaluwenburg, chairman, Nematode Committee, urges:

Discussion of nematode pests of economic plant crops:

Sugar
Pineapple
Rice
Coconut
Fruits
Fiber crops (abaca)

Discussion of nematode pests of livestock, poultry, etc.

Food production as affected by nematodes affecting human health.

Section V. Soils and Fertilization. Chairman Guy R. Stewart has prepared with his committee a tentative agenda to submit.

It is believed that the work of this Committee would logically divide itself into two main divisions:
Division I—*Soil science or pedology.*

The work considered in this division would concern itself with the more purely scientific problems of the origins and properties of the soils of the Pacific area. Reports of work carried out might well be considered under the several classifications of the International Society of Soil Science. These are:

Section I—The study of soil mechanics and soil physics.

Section II—The study of soil chemistry.

Section III—The study of soil biology and biochemistry.

Section IV—The study of soil fertility.

Section V—The study of soil classification.

Section VI—The application of soil science to land cultivation.

Division II—*Soil adaptations and fertilizer requirements of the crops of the Pacific.*

Under this head it would be planned to consider the specific adaptation of various crops to special soil types, also the pot and laboratory tests employed to determine fertilizer needs and larger scale fertilizer plot tests. This work might be subdivided as follows:

Section I—Application of soil classification and soil surveys to the study of the needs of special crops.

Section II—Laboratory methods, chemical, physical and biological, employed to determine crop fertilization.

Section III—Pot and field tests conducted with the major crops of the Pacific.

It would probably be desirable in considering reports made under Division II to hold one or more meetings devoted to a consideration of the needs of an individual crop such as rice, sugar cane or coffee. This would bring together the workers with similar interests and enable them to present their views regarding their special problems. In other words we should have a series of seminar or discussion groups of soil workers from the different countries which raise the same crops. The program could be so arranged that each group could occupy a proportionate part of the time alloted to the general subject of soil adaptations and fertilizer requirements of the Pacific crops.

Section VI. Reclamation Section.

Mr. H. A. Wadsworth, chairman, reports for his committee the following tentative agenda:

1. Irrigation as a Factor in the Agriculture of the Pacific Basin.

2. The Reclamation of Tidal Flats for Agricultural Uses.

   a. Experience in Sacramento Valley.
   b. Kikaha reclamation on Kauai.

3. Irrigation Resources of Pacific Lands and their Present Degree of Utilization. A summary of progress of irrigation and in the Economic Limit of Increase.

4. Drainage: Its importance in permanent Agriculture under irrigation and in the extension of the irrigated area.

   a. The formation of alkali and its eradication.

   b. The problems of a high water table, its cause and methods of eradication.

5. Land Clearing and Land Erosion.

   a. The Use and Limitations of Explosives in Land Clearing.
   b. Mechanical Devices in Land clearing.
   c. Progress in the Study of Methods of Prevention of Soil Erosion.
   d. Methods of Measuring Soil Erosion.

6. Problems of Reclamation Finance and Land Settlement.

   a. The Policy of the U. S. R. S. in Land Settlement.
   b. Methods in Australia and elsewhere.
   c. Red Cross Activity in China.
   d. Methods under State and Private.

7. Selling Organizations as a safeguard in highly specialized irrigated areas.

8. Forests as Related to Stream Flow.

9. Land Classification and Economic Survey as a Preliminary to Reclamation.

   a. Soil type.
   b. Environment.
   c. Nearness to Market.

Section VII. Forests and Forest Products.

Agenda suggested for discussion by Chas. S. Judd:

1. Water as used in connection with food production for
   a. Irrigating crops.
   b. Moving crops.
   c. Domestic use of agriculturists.

2. Forests as they conserve water, hold back floods and form windbreaks.

3. How forests may be protected, built up and maintained in best possible manner, by
   a. Introducing new species for different sites.
   b. Eliminating undesirable vegetation such as staghorn fern and grasses.

Methods of propagating.

4. Nut trees and other fruit bearing trees for increasing the food supply.

Some further suggestions:

1. For the conservation of existing supplies and production of future supplies of timber, fuel, pulp and other products.
   a. By scientific management of the forest.
   b. By protection of forests from fires.
   c. by protection of forests from invasion by destructive grazing animals and noxious vegetation.
   d. By control of insect pests and plant diseases.
   e. By reforestation.
2. For water conservation, soil conservation and flood control.
   a. By creating and protecting reserves on strategic areas.
   b. By reforesting denuded and eroded areas.
3. For amelioration of climate.
   a. By increasing rainfall.
   b. By creating and maintaining humidity essential to certain crops such as cocoa and coffee.
   c. By affording to crops protection from wind.

Section VIII. Animal Industry.

Mr. L. A. Henke submits for his committee the following tentative agenda:

1. Dry Land Grasses and Fodders for Live Stock.
2. Live Stock Parasites.
3. Means of Improvement in Animal Breeding.
4. Possibilities of a Hog Trade in the Pacific Area.
5. The Vitality of Live Stock in the Tropics.
6. Sugar Cane Manufacture By-Products as a Feed for Live Stock.
7. Pineapple Cannery By-Products as a Feed for Live Stock.
8. Contagious Abortion.
9. Tuberculosis.
10. Liver Fluke and Its Control.
11. The Place of Live Stock on a Plantation.
12. Problems in the Transportation of Live Stock across the Pacific.
13. The Role of the Products of the Dairy Cows in the Health of the people.
14. The Milk Supply of a Large City.
15. The Pure Bred Dairy Cattle Business in the Pacific Area.
16. Rinderpest and Its Control.
17. The Value of the Water Buffalo in the Pacific Area.

18. Animal Quarantine Problems in the far East.

Section IX. Fisheries. Dr. David Starr Jordan, President of the Pan-Pacific Research Institution and Chairman of its Fisheries Council prepared this agenda.

Check list of Species (already in type), Jordan & Evermann.

Species of Commercial Value.

Preservation of Coral Reef fishes; from poor fishing; from dynamite.

Effects of poor fishing.

The Mullet Pond industry.

Habits of Aku (Katsuwanus); Spear fish or Marlin (Makawa); Salt Fish (Ictiophorus); and other giant Mackerel-like fishes used for canning.

It is expected that Dr. Barton W. Evermann, chairman of the Marine Biology Section of the first Conference, will prepare the agenda on the preservation of mammals of the Pacific.

Section X. Economics. During the unofficial visit to Hawaii of Dr. Iwao Ayuzawa, a secretary of the International Labor Office at Geneva, a conference was held with the local heads of the various sections and it was agreed with Dr. Ayuzawa that the Economic Section should become a section on Labor and Distribution of Food Products in the Pacific area. The heads of labor organizations as well as transportation heads will be invited from Pacific lands to participate in the discussions and deliberations of this section. "Communications" by airplane and wireless will also be included in this section.

Section XI. International Law and Agreements. The Pan-Pacific Legal Council was an outgrowth of the Legal Section at the first Pan-Pacific Food Conservation Conference. Discussing this section, of which he is a member, Dr. George Grafton Wilson calls attention to the fact that

"It is time that the conservation of maritime fauna and flora of the Pacific Ocean received more attention. The Halibut Convention in regard to the North Pacific Coast of the United States and Canada is a step in that direction.

"Such protection can only be secured by international agreement as in the North Sea Fisheries Convention of 1882.

"It might not be a bad plan for you to collect, print and distribute the conventions which have been agreed upon along these lines, as this would be a concrete evidence of what might be done and what is needed. If these conventions were before your legal section further action would be a natural consequence."

Some time ago a committee was appointed to draw up a tentative agenda for the Pan-Pacific Legal Conference, the late Judge Dole naming the following: Judge Walter F. Frear, Ex-Governor of Hawaii, chairman; Sir Joseph H. Carruthers, Ex-Premier of New South Wales; Prof. K. Takayanagi, Professor of Law, Tokyo Imperial University; Col. F. M. Brown, Judge Advocate, U. S. Army, Hawaii; Miss Carrick Buck, Assistant District Attorney. Dr. George Grafton Wilson was also a member of this council.

The following Resolution was passed:

"Resolved, That it is the sense of this meeting that the objects and purposes of the proposed Legal Conference shall be the following:

"(1) To discuss and recommend the uniformity of the laws of the countries bordering on the Pacific, in so far as they relate to the matters on which the nationals of the different countries come into contact with each other, such as negotiable paper law, maritime law, commercial law, etc.

"(2) Collaboration with the Conference on International Cooperation for the purpose of assisting it in its projects in such manner as to avoid collision

with principles of international or municipal law.

"(3) Interchange of information and ideas between different countries in such manner as to aid each country in the solution of its local problems, such as the regulation of contingent fees, assistance to poor people to obtain justice"

It was further "Resolved, That it is the sense of this meeting that the resolutions expressed by the Conference shall, before they are finally adopted, be passed upon by the Pan-Pacific Legal Conference."

Sir Joseph Carruthers had at this time urged a declaration for an international law in regard to the fisheries of the Pacific, citing the exploitation Pacific waters by the Norwegians during the war, and the probable ruining of the fur seal in the next three years if their depredations were not checked. Not only are fishery experts needed, he said, but lawyers who can draw up the resolutions to be presented to the various governments so that the law will be correct and binding. At the Food Conservation Conference the resolutions were not put through by lawyers, but by fishery men, and were not what was required.

Section XII. Permanent Organization. The first Pan-Pacific Food Conservation Conference passed a number of resolutions looking toward permanent organization. These resolutions may be made at the Second Conference the basis of a permanent organization, or the Pan-Pacific Research Institution (an outgrowth of the first conference) may be reorganized to act as a continuation body, or the delegates may determine to organize as a permanent Pan-Pacific Food Conservation body, calling its own conferences.

Correspondence and suggestions as to the formation of Section XII is invited.

Suggestions as to alterations in the above tentative agenda are invited from scientists and others interested, and may be sent directly to the Pan-Pacific Union, Honolulu.

A few of the bound volumes of the Proceedings of the First Pan-Pacific Food Conservation Conference still remain in stock and may be secured from the Pan-Pacific Union, Honolulu. The Bulletin of the Pan-Pacific Union for October, 1924, containing the Resolutions passed at the first Pan-Pacific Food Conservation Conference, will be mailed free to anyone desiring this.

The Bulletin of the Union and the quarterly Journal of the Pan-Pacific Research Institution will be sent free to any scientists who make the request.

The Mid-Pacific Magazine with its quarterly Journal of the Pan-Pacific Scientific number will be sent on subscription price of $3.50 or free to members of the Pan-Pacific Association, dues ten dollars. All publications of the Pan-Pacific Union are sent to members of the Association.

Those who contemplate attending the Second Pan-Pacific Food Conservation Conference, Honolulu, in August, 1931, are asked to get in touch with the Pan-Pacific Union at as early a date as possible. Scientists passing through Honolulu are welcomed as guests at the Institution.

Experiment Station of the Hawaiian Sugar Planters' Association

The sugar planters of Hawaii have been banded together in an organization since 1882, at which time the Planters' Labor and Supply Company was formed. However, cooperation has been a keynote of the industry from the very early days, for in 1851 there was organized the Royal Hawaiian Agricultural Society, which held annual meetings for a period of six or seven years, laying a foundation stone of mutual helpfulness.

It was not until the nineties, however, that the technical problems of the industry suggested the employment of a chemist and the establishment of an Experiment Station. With the inauguration of this broader field of activity the Planters' Labor and Supply Company became, in 1895, the Hawaiian Sugar Planters' Association.

From the small beginning, thirty-three years ago this month of April, the Experiment Station has expanded its activities as various problems were assigned to it. The station, then, reflects the progressiveness of the plantations, and their efficiency in undertaking cooperatively important work ill-suited to individual effort.

At the present time the Experiment Station of the H. S. P. A. has six departments: Entomology, Forestry, Pathology, Agriculture, Sugar Technology, and Chemistry.

In the control of insect pests the entomologists have several very important achievements. Biologic methods of control are resorted to principally, that of fighting insects with their enemies or parasites. It is generally conceded that the very life of the sugar industry in Hawaii is dependent upon this means of pest control.

Forestry is intimately allied with sugar production when one considers the comparatively small and steep water sheds which furnish irrigation water and fluming water to the plantations. This department cooperates with the Territorial Board of Agriculture and Forestry in work related to the preservation and improvement of the forest cover. A great number of valuable trees and plants have been introduced from all parts of the world, and as Hawaii has the only frost-free area of the United States, these introductions will serve in time to make the Hawaiian Islands America's foremost botanical garden.

The agricultural department cooperates with the plantations in developing improved methods of fertilization, irrigation and cultivation, and in addition to this conducts sugar cane breeding work for the propagation of new and valuable cane varieties. An important feature of this endeavor is the hybridization of the so-called standard or large-stick canes with the thin-stick, half-wild canes. The object of these crosses is to combine the good qualities of the one with the hardy and disease resistance qualities of the other.

The pathology department by a study of sugar cane diseases works towards reducing losses from a few diseases which Hawaii has and towards the protection of the fields from the great number of foreign diseases which have thus far been successfully barred.

The chemistry department in addition to a large amount of miscellaneous chemical service to the plantations, conducts soil surveys and research work to aid plantations in the management of their lands, particularly in connection with the best possible utilization of commercial fertilizers.

The sugar technology department conducts investigations and cooperates

with the factory operators in the improvement of factory methods and chemical control procedures.

The staff of the Experiment Station numbers about eighty. The six departments referred to are headed by the following specialists:

Entomology: O. H. Swezey and F. Muir.
Forestry: H. L. Lyon
Agriculture: J. A. Verret.
Pathology: J. P. Martin.
Chemistry: G. R. Stewart.
Sugar Technology: W. R. McAllep.
Hamilton P. Agee is director.

Outline for Treatment of Tropical Crops

The following suggestions by J. M. Westgate, the Director of the U. S. Government Agricultural Experiment Station in Hawaii might well serve as a model for kindred outlines from food scientists in every Pacific land—

Descriptions:
(a) Botanical
(b) Popular
(c) Varieties—botanical and commercial.

Historical:
Data re development of industry from earliest times.

Statistics:
(a) By countries or regions with maps showing graphically the data.
(b) By years showing rise and fall and present trend of industry.
(c) Exports and Imports by countries for indicated years.
(d) Acreage and acre yield data.

Requirements of Production:
(a) Climatic
(b) Soil
(c) Water — irrigation — drainage —conservation
(d) Propagation
(e) Preparation of land
(f) Planting
(g) Cultural
(h) Fertilizer
(i) Time to first crop—frequency of crops—length of productive period from one planting.

Harvesting and Preparation for Market.

Transportation to Market:
(a) General
(b) Losses in transit, storage, and market.

Other Marketing Problems:
(a) Competing sections
(b) Competing crops
(c) Competing practices or customs

Utilization.

By Products (and Other Products from the Same Crop).

Enemies and Other Drawbacks to Production:
(a) Insects; (b) Plant diseases; (c) Animals; (d) Unfavorable climate; (e) Tariff walls.

Economics:
(a) Labor problems; (b) Plantation systems (contract labor, day labor, small independent growers, contract growing). Management by corporation, industrial owner, or tenant; (c) Size of farm units; (d) Cost of land, its preparation, its tillage; (e) Labor requirements, its cost and availability; (f) Implements, kind and cost; (g) yields and costs of production; (h) Quality of product; standard grades and packages; (i) Spread of prices producer to consumer; (j) Big growers.

Extent of Breeding and Experimental Work:
(a) Experiment Stations featuring work with crop;
(b) Men specializing;
(c) Leading projects under way, location, leaders, source or reports;
(d) Periodicals and series of bulletins containing useful data.

Problems Bibliography:
Books, periodicals, trade journals, bulletins, annual reports.

Canada Experimental Farms and Stations

Dr. E. S. Archibald, Director, Experimental Farms, Ottawa, Ont.

J. A. Clark, Superintendent, Experimental Station, Charlottetown, P. E. I.

W. S. Blair, Superintendent, Experimental Station, Kentville, N. S.

W. W. Baird, Superintendent, Experimental Farm, Nappan, N. S.

C. F. Bailey, Superintendent, Experimental Station, Fredericton, N. B.

J. A. Ste. Marie, Superintendent, Experimental Station, Ste. Anne de la Pocatiere, Que.

G. A. Langelier, Superintendent, Experimental Station, Cap Rouge, Que.

J. A. McClary, Superintendent, Experimental Station, Lennoxville, Que.

P. Fortier, Superintendent, Experimental Station, La Ferme, Que.

Acting Superintendent, Experimental Station, Farnham, Que.

J. E. Montreuil, Superintendent, Experimental Station, L'Assomption, Que.

J. P. S. Ballantyne, Superintendent, Experimental Station, Kapuskasing, Ont.

Acting Superintendent, Experimental Station, Harrow, Ont.

W. R. Leslie, Superintendent, Experimental Station, Morden, Man.

M. J. Tinline, Superintendent, Experimental Farm, Brandon, Man.

W. H. Gibson, Superintendent, Experimental Farm, Indian Head, Sask.

J. G. Taggart, Superintendent, Experimental Station, Swift Current, Sask.

W. A. Munro, Superintendent, Experimental Station, Rosthern, Sask.

G. D. Matthews, Superintendent, Experimental Station, Scott, Sask.

F. H. Reed, Superintendent, Experimental Station, Lacombe, Alta.

W. H. Fairfield, Superintendent, Experimental Station, Lethbridge, Alta.

R. G. Newton, Superintendent, Experimental Station, Invermere, B. C.

W. T. Hunter, Superintendent, Experimental Station, Summerland, B. C.

W. H. Hicks, Superintendent, Experimental Farm, Agassiz, B. C.

E. M. Straight, Superintendent, Experimental Station, Saanichton, B. C.

W. D. Albright, Superintendent, Experimental Sub-Station, Beaverlodge, Alta.

Robt. Jones, Superintendent, Experimental Sub-Station, Fort Vermilion, Alta.

Plant Pathological Laboratories,

R. R. Hurst, Officer-in-Charge, Plant Pathological Laboratory, Charlottetown, P. E. I.

J. F. Hockey, Officer-in-charge, Plant Pathological Laboratory, Kentville, N. S.

D. J. MacLeod, Officer-in-Charge, Plant Pathological Laboratory, Fredericton, N. B.

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Chinese Food Plants for Hawaii

By Edward Shim

Imperial Chemical Industries (China) Ltd.

It is interesting to note that the Union is planning another Food Conservation Conference to be held in August, 1931. Although I should like to attend it very much, I am afraid that my work, which generally keeps me most busy at that time of the year, may keep me from attending. My company is planning a trip for me to Europe and America, but this may not come just at the time of the Conference. However, I shall keep you informed if I can participate.

As to the food plants requested for the Pan-Pacific Botanic Garden in Hawaii:

Kaoliang, Holcus sorghum L., belongs to the sorghum group, similar in certain respects to kafir, milo, shallu, durra, broom-corn, and amber sweet sorghum.

In North China and Manchuria kaoliang is one of the most important cereals, serving as staple for man and the principal grain feed of animals. It grows to a height of 8 to 15 or more feet. The spike or head, which bears the grain or seed, is at the top of the culm. The kind of spike, whether an open panicle or a dense and compact head, depends on the variety. The seed is sown in the first part of April, at which time manure is dropped into the furrow from a basket following the sower. The furrows are covered up after seeding, and a stone roller is passed over the covered furrow to compact the soil and the seed. This rolling helps germination. The crop needs little attention during its growth besides keeping off weeds. In the first part of September harvest takes place, at which time the heads are in brown purple tint, which colour is derived from the cases containing the grain. At harvest the heads are cut off with a knife and threshed; the stems are cut off with a knife near the roots and made into bundles. The separation of the outer casing from the grain, called threshing, is accomplished by a stone roller harnessed to an ox, donkey or mule. After removal of undesirable heads and after grain is passed through a winnowing machine or tossed in the air, it is ready for sale.

The whole plant may be utilized as follows:

1. Staple food for man.
2. Grain feed for animals.
3. Outer leaf layers made into mats.
4. Stalks for fencing, bridging, house building and for fuel.
5. Roots for fuel.
6. Grain into alcohol.
7. Heads into fuel and broom.

When prepared for food in Manchuria, the cereal is washed in cold water and poured into boiling water, in the proportion of 4 parts water to 1 of grain, and boiled for 1 hour, when it is swollen to 3 to 4 times its original size. Then it is ready for eating.

There are several Chinese food plants which, I think, may be tried in Hawaii, although I am not sure if they can be adapted to the new environment. Some of these are: (1) millet of the different varieties; (2) sesamum; (3) green bean, Phaseolus mungo; (4) kaoliang, and (5) soya beans.

I am mailing you a copy of a report on the sericulture in South China, in which my report on the use of manures and fertilizer on mulberry appears.

Japan's Food and Population Government Report

An Imperial Commission on the Studies of Population and Food Problems was instituted by the Government of Japan two years ago. It was divided into two committees of food and population which in turn were divided into several sub-committees. Recently a plenary session was held in order to pass upon the replies to the questionnaire put by the Government.

The following are the plans adopted at the general meeting of the commission:

The Population Section:

"A careful consideration is necessary for dealing with the population problems in Chosen and Taiwan. The similar questions in Manchuria, Mongolia, Siberia and South Seas islands which have close connection with the above districts are also carefully to be dealt with. With this in view, this department considers:

1. That the development of Chosen, Taiwan, Karafuto, Kuantung Province and the South Seas islands, especially Chosen and Karafuto, is necessary.

2. That the Sino-Japanese negotiations are necessary to stabilize the land problems in Manchuria-Mongolia district, and to promote money markets for farmers and to secure the living of Japanese and Chosenese there.

3. That obtaining more food materials in Manchuria and Mongolia by Sino-Japanese and Japanese-Mongolian cooperation is advisable.

4. That Japan and Russia should join hands to developing the natural resources in Siberia.

5. That Japanese and other countries concerned should cooperate in increasing the production of food materials in the South Seas Islands.

6. That the natives in Taiwan, Karafuto, and South Seas Islands should be protected, and that the Ainus in Hokkaido should be properly directed."

The Food Section:

This Section hereby replies to the Government regarding the food problems involving the livestock industry.

"This industry is one of the most important branches of the Empire's industry, viewed from its supply of food, nourishment for the nation and the present prosperity of the farmers' management of the industry. This Department with the above in view considers:

1. That the proper institutions should be established to encourage the industry.

2. That the better methods should be adopted as regards production, forwarding, storage, etc.

3. That improvement should be made for the supply of better and cheaper cow's milk.

4. That the proper arrangements should be made for the supply of better beef, keeping the main land and Chosen and the other districts in contact.

5. That poultry farming and increased marketing of eggs should be undertaken.

6. That the cattle insurance system should speedily be materialized.

7. Census for live-stock raising industry should be taken at an early date.

8. A specific investigation commission should be organized to discuss problems concerning the foodstuffs made from live-stock.

"The Food Section considers it necessary to organize the Fundamental Fishery Investigation Commission, to promote the production in this line.

"The Food Section considers it necessary to organize the commission for investigation of fishery in inland rivers, lakes, etc., to increase the food production in this branch of industry."

These are subjects all for discussion at the Pan-Pacific Conservation Congress in Honolulu, August 1931.

Results in Australia from the First Pan-Pacific Food Conference

(A Letter From Sir Joseph Carruthers.)

Legislative Council, Parliament House,
Sydney, N. S. Wales, Australia.

You will be glad to learn that the Millions Club has practically agreed to act as the representative of the Pan-Pacific Union in Australia. In point of fact, I think this agreement was arrived at many years ago, but has been forgotten by you, though it has not been forgotten on this side.

Lately I have noted some results which have followed the Pan-Pacific Conference on the conservation of food in the Pacific areas. You will remember that we dealt in 1924 at that conference with the question of dealing with the prickly pear menace to Australia. Some forty or fifty million acres of land—rich land at that—has been covered by this plant pest. Now, as the result of action which was stimulated by the proceedings of your conference, the pest has been checked and we can look forward to the time, within a reasonable period, when we shall have entirely subdued it.

We owe a great deal to America in this matter, because we have been importing insects therefrom which have been carrying on a work of destruction of the prickly pear plant—the cochineal insect and other insects of great value as parasites on the plant.

I have kept Dr. Howard (president of the Conference) duly informed of every stage of the campaign for the elimination of this plant pest. All the reports go to show that millions of acres are now being restored to their condition of usefulness for pastoral and agricultural purposes, but of course it will take time before the campaign ends with complete success.

I think that these facts ought to be made known, because they bear testimony to the valuable work which your Conference collaborated in. Of course, we cannot give all the credit to the Pan-Pacific Conference, but certainly it deserves a considerable share in it.

You will remember resolutions carried at the same Conference with regard to investigations to be carried on in Papua and New Guinea, relating to the varieties of sugar-cane indigenous to that island and to coping with diseases and plant pests affecting the cane industry.

Recently I had the pleasure of introducing to our Premier a large deputation, headed by Dr. Branders (who was also one of the delegates at the Pan-Pacific Conference in 1924), now the head of the Bureau of Plant Breeding, etc., specially relating to sugar, at Washington, U. S. A. I had the pleasure of introducing him and some seven or eight visiting scientists from America to the head of the New South Wales government, and through that government, to the federal government. Arrangements have been made facilitating the visit of these scientists and experts to Papua and to New Guinea.

I may add that in many cases other members of the Conference have visited here. Quite recently Professor Cockerill of the University of Colorado spent some weeks as my guest. He has been studying zoology and natural history in Australia, and I obtained for him facilities for traveling free of cost over our vast railway system, which is a government institution here.

Another visitor was Dr. Hulse of Los Angeles, interested in the preservation of fruits by the dehydration process. He also was my guest for a time.

I visited when in Fiji, the sugar plantations and met the delegates who went in 1924 to the Honolulu Conference—Mr. CClark and others who are on the sugar plantations in Fiji.

Kindest regards.

Yours sincerely,

J. H. CARRUTHERS.